

NEMATODES FROM A COMMON INDIAN LIZARD (*UROMASTIX HARDWICKI*) WITH REMARKS ON *KALICEPHALUS PARVUS* MAPLESTONE, 1932.

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The material described in the present paper consisted of ten tubes of nematodes from the intestine of *Uromastix hardwicki* and one from the intestine of pigeon, sent for identification by Col. Taylor, Director of the Central Pasteur Institute, India, to whom I wish to acknowledge my indebtedness. The pigeon nematodes consisted solely of *Ascaridia columbae* (Gmelin, 1790) : those from the lizard comprised four species of *Thelandros* of which three are new. I have here to express my thanks to Dr. H. A. Baylis of the British Museum for kindly sending me the diagnoses of *Thelandros sceleratus* Travassos, 1923 and *T. oswaldocruzia* Travassos, 1925.

***Thelandros taylori*, sp. nov.**

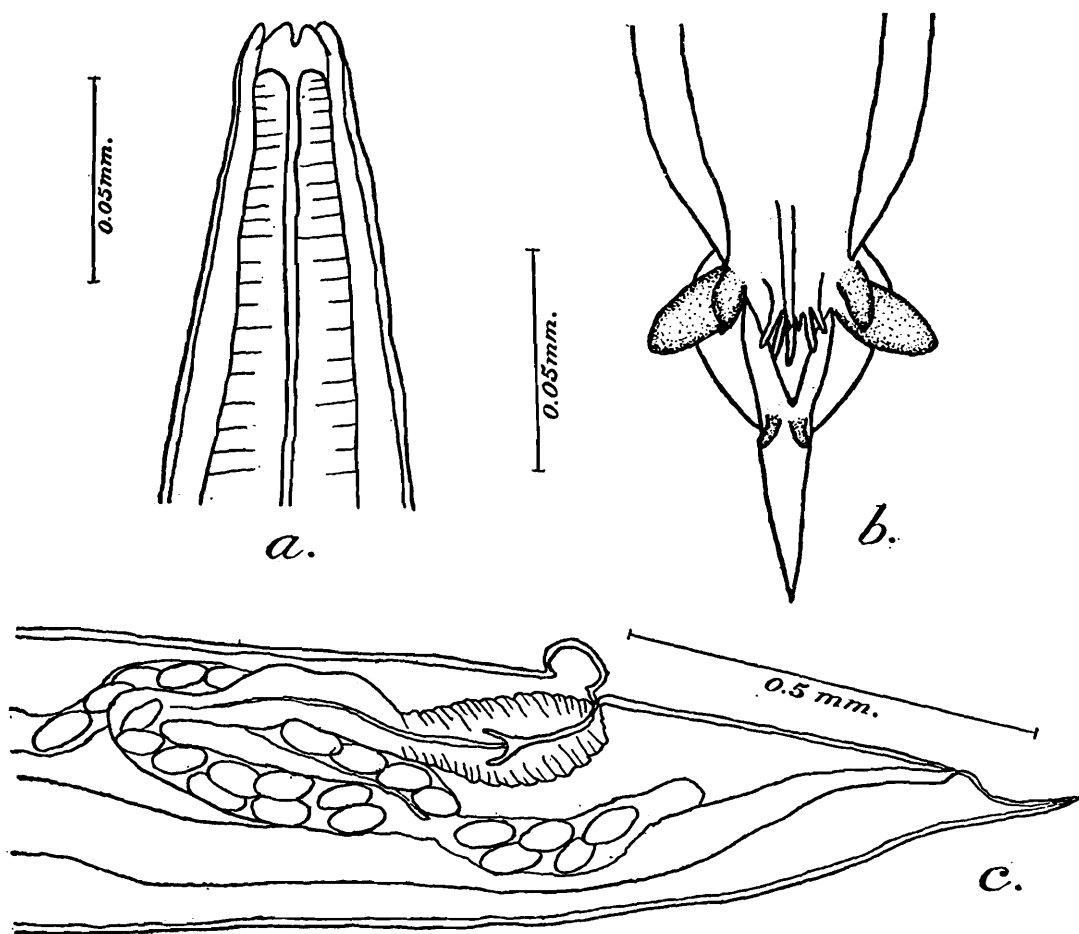
Adults small, females approximately one and half times as large as males ; latter posteriorly curved ventrally, former more or less straight. Body in both sexes tapering from the middle towards the extremities. Cuticle thick, with fine transverse striations. Lateral alae absent, except near posterior portion of male. Body margins in some females were found to be appreciably separated from the cuticle simulating the presence of lateral alae : careful examination revealed that the striations in such structures corresponded with the cuticular striations of the body and that the appearance was due to an artefact caused by plasmolysis at the time of fixation. Mouth terminal, bounded by three bi-lobed lips. Pharynx small. Oesophagus long, muscular, with more or less uniform breadth, measuring a little approximately one-third length of body and projecting into pharynx. Excretory pore situated behind the bulb.

Male : length 2-2.5<sup>1</sup>, maximum diameter near middle of body 0.15-0.22. Cuticular striations 0.007-0.012 apart. Oesophagus including the bulb 0.624-0.84 long. Nerve ring approximately 0.098-0.13 from anterior end. Tail 0.05-0.078 long, suddenly constricted at level of cloaca and continued as a dorsally-directed process with a terminal spike, the process being provided with two conspicuous lateral alae extending for more than half its length. Three pairs of caudal papillae present, two pairs preanal and one pair at the extremity of the caudal alae, at approximately the beginning of the spike. Of the two cloacal pairs, the posterior larger than the anterior. Anterior lip of cloaca fringed, the posterior forming a comparatively long posteriorly-directed conical process with a blunt end. Spicule short, tapering to a fine point, 0.035-0.045 in length.

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<sup>1</sup> All measurements are in millimetres.

Female: Length 2.96-4, maximum thickness 0.21-0.4. Cuticular striations 0.012-0.015 apart. Length of oesophagus 1-1.5. Nerve ring situated approximately 0.14-0.2 behind anterior end of body. Vulva with prominent anterior lip, close to anus. Vagina muscular, directed anteriorly, 0.08-0.12 long, passing forwards to join a more or less flask-shaped muscular sphincter: this consists of a very muscular bulb, the centre of which is hollowed out and bears a large papilla carrying on its anterior face the opening of the genital canal. Ovejector short, very muscular, directed anteriorly. Arising from it a common reservoir egg sac or trompe curves backwards and divides anteriorly into two uteri, one of which curves posteriorly and then runs anteriorly parallel to the other. Coils of ovaries on each side of oesophageal bulb and the excretory pore a little behind it. Tail short, 0.108-0.156 long, ending in a fine point. Eggs oval 0.08-0.095  $\times$  0.047-0.065.



TEXT-FIG. 1.—*Thelandros taylori*, sp. nov.

a. Dorso-ventral view of anterior end; b. Ventral view of posterior end of male; c. Lateral view of posterior end of female.

In most characters the present species agrees with the diagnosis of *Thelandros* Wedl, 1862: the presence of caudal alae and the peculiar posterior displacement of the vulva towards the anus are features in which it differs. A resemblance to *Pharyngodon* Diesing, 1861 and *Aleuris* Thapar, 1925 is afforded by the first character. Too much importance has been attached by some workers to the generic value of the caudal alae in the male Reptilian Oxyurids. *Mehdiella* Seurat, 1918

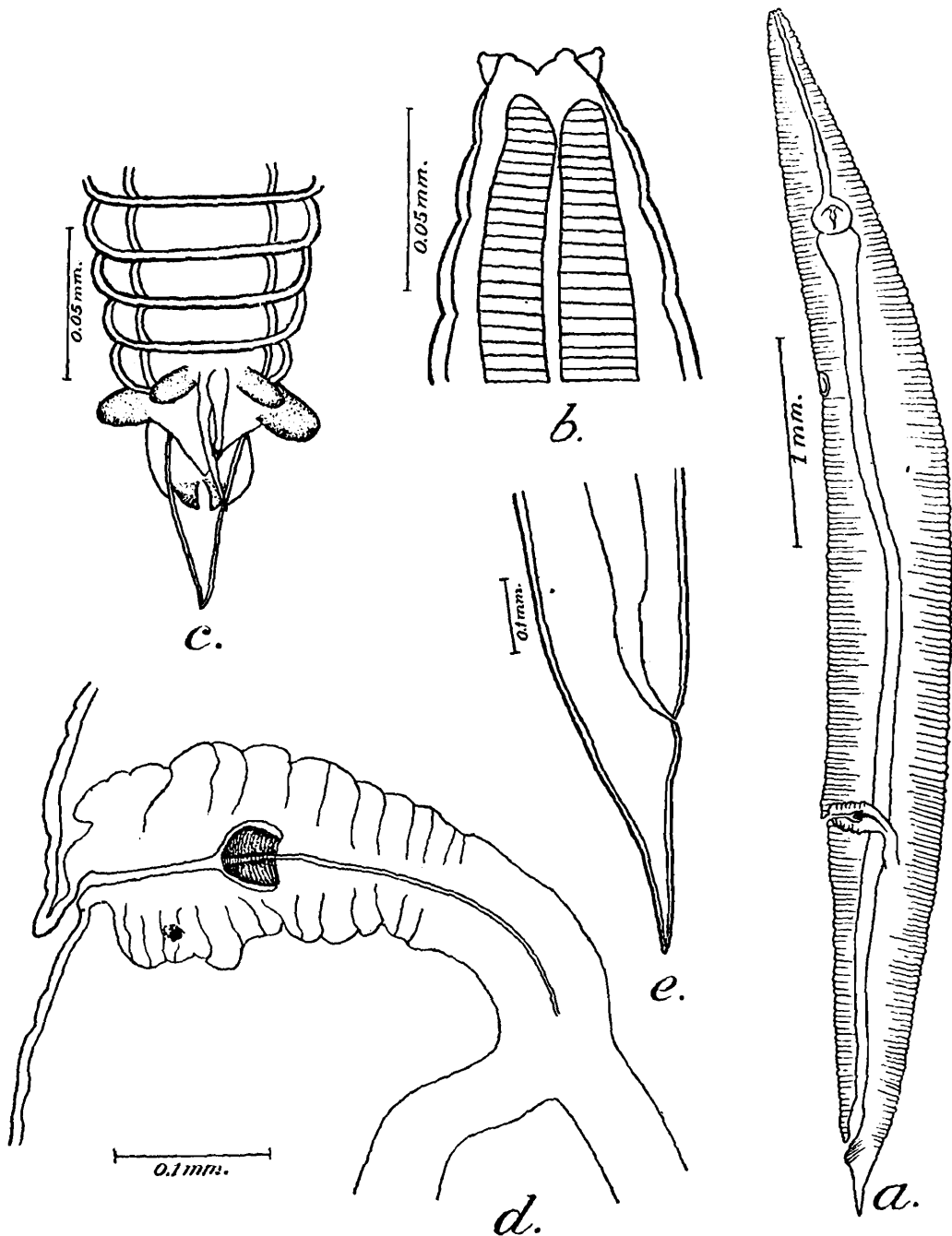
has been separated by Seurat (1918) and Yorke and Maplestone (1926) from *Tachygonetria*, Wedl, 1862, mainly on the presence of narrow caudal alae in the male: this character, however, has been ignored by Baylis and Daubney (1926), who accordingly have regarded the former genus as a synonym of the latter. Further work by Ortlepp (1933) has revealed that in the genus may exist all variations, from a non-alar type as in the majority of the species, through *T. microstoma* (Drasche, 1884) and *T. uncinata* (Drasche, 1884) with narrow alae, to the well developed alar condition in *T. poweri* Ortlepp, 1933, and *T. quadrilabiata* Ortlepp, 1933. It is also possible that the same condition exists in the genus *Thelandros* and no importance, therefore, beyond a specific value can be attached to the presence of this character in the present form. The position of the vulva close to the anus indicates a relationship with the genus *Thaparia* Ortlepp, 1933, but in the absence of other characters, such as a differentiated glandular part of the oesophagus, a spicule of extraordinary large size, and the presence of a gubernaculum, this resemblance must be dismissed. The peculiar position of the vulva, though an important character and one which does not occur in any other species of *Thelandros* is not of sufficient importance to justify the creation of a new genus.

***Thelandros baylisi*, sp. nov.**

Worms small, females approximately one three-fourth times as long as males. Posterior portion of latter curved ventrally, females straight. Body broadest in the middle, attenuating towards extremities. Cuticle thick, with comparatively coarse striations. Body wall in some females compressed a little behind the head giving rise to false appearance of cephalic alae like those of *T. taylori*, sp. nov. Cuticle increases in thickness, appearing as broad rings in posterior portion of male. Mouth with three prominent bi-lobed lips, each provided with a papilla. Pharynx small, with the duct of the oesophageal glands opening on its dorsal surface. Oesophagus long, with a pre-bulbular constriction. Oesophago-intestinal valves projecting into the chyle intestine. Excretory pore a little behind the bulb.

Male: Length 2.5-3.7, maximum diameter 0.175-0.22. Oesophagus including the bulb 0.65-0.8 long. Oesophageal bulb more or less spherical, approximately 0.98 in diameter. Tail constricted at level of cloaca, provided anteriorly with a pair of small alar expansions, one on each side. Anterior lip of cloaca fringed, though much less so than *T. taylori*, sp. nov.: posterior lip conical and produced backwards, ending bluntly. Three pairs of caudal papillae present: two pairs large and preanal, the posterior pair being larger than the anterior, third pair small and situated at the extremity of narrow caudal expansions. Spicule short, 0.03-0.06 long. Gubernaculum absent. Posterior end of male peculiarly thickened and enclosed in a prepuce like sheath as in *T. micruris* Rauther, 1918, and *T. sahariensis* Baylis, 1930. This originates from the region of the cloaca, extends forward for a short distance and gradually merges into the body cuticle. Cuticle in the sheath extremely thick, as a result the entire surface of the rings formed

by its striations cannot be brought in one focus. The pronounced separation of the cuticle of the sheath from the ventral surface of the body, recorded in *T. sahariensis* Baylis, 1930, and figured by Rauther in *T. micruris*, does not usually exist in this case. It was noted in a few cases where it was obviously the effect of plasmolysis: this explanation may also possibly apply to the cases quoted.



TEXT-FIG. 2.—*Thelandros baylisi*, sp. nov.

a. Lateral view of female; b. Dorso-ventral view of anterior end; c. Ventral view of posterior end of male; d. lateral view of valval region; e. Lateral view of posterior end of female.

Female: Length 3.8–6.3, maximum breadth 0.3–0.66 nearly in the middle of the body. Cuticular striations approximately 0.16–0.06 apart. Oesophagus 1–1.62 long. Intestine continued into a well-pronounced rectum. Nerve ring approximately 0.165–0.22 behind

anterior end of body. Vulva well behind middle of body, 1.26–2.2 from the posterior extremity, provided with an anterior lip, shorter than that of *T. taylori*, sp. nov. Genital canal opening into the muscular vagina through a large papilla at the apex of the ovejector. The egg-sac or trompe agrees with that of *T. micruris* Rauther, 1918, in shape and size. Uteri arise posteriorly from the trompe and run forward, parallel to each other. Ovarian coils close to level of vulva. Tail, 0.234–0.37 long, attenuated posteriorly unlike *T. micruris*. Eggs oval, with a thin shell  $0.08\text{--}0.098 \times 0.05\text{--}0.06$  in size.

The presence of a caudal prepuce-like sheath in the male distinguishes the present species from all others except *T. micruris* Rauther, 1918 and *T. sahariensis* Baylis, 1930. The resemblance to the former is very close as both have the same host and the same geographical distribution: they differ however in the more posterior position of the excretory pore in the new form, in the female of a similar posterior displacement of the vulva and, in the male, of narrow caudal alae. Allowing for the movement of the decimal point one place to the right in *T. micruris* Rauther, 1918 as suggested by Baylis (1930, p. 126)—a procedure which harmonises these measurements with those of specimens of that species obtained by me from the Kasauli material—the present form shows differences in size and proportionate lengths of the oesophagus. The differences from *T. sahariensis* are obvious discrepancies in the size of the body and the proportionate lengths of body structures. The more posterior position of the vulva and the presence of narrow caudal alae, are additional characters which distinctly separate these two forms.

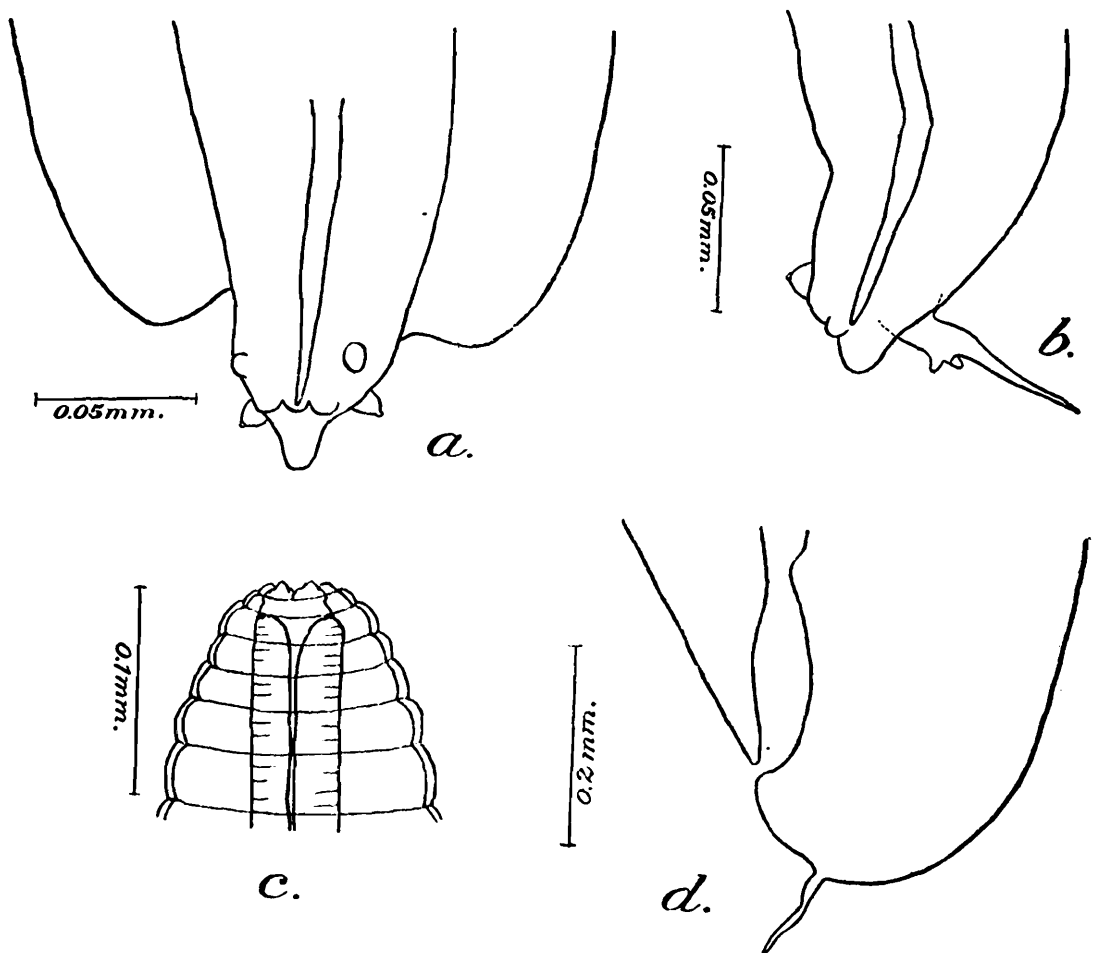
### ***Thelandros kasauli*, sp. nov.**

Unfortunately only two male specimens—both badly preserved—were obtained from a total of 1156 parasites: one with unusually compressed body and the other a young specimen with the oesophagus protruding out of the ruptured cuticle. Lateral alae distinct in the latter and originate approximately 0.236 from the anterior end, narrow at first but gradually widening posteriorly, attaining a breadth of approximately 0.04 towards the posterior end of body. Caudal extremity with the usual three pairs of papillae—one preanal and two postanal. The preanal pair and the anterior pair of postanal papillae well-developed, approximately of the same size: posterior pair of postanal papillae situated on terminal appendage of tail at about one-third its length from the base. Anterior lip of cloacal aperture simple, with projections only at angles. Posterior lip a comparatively long posteriorly directed conical process with a blunt termination.

Dimensions of both the specimens are as follows:—

	No. 1.	No. 2.
Total length	2.32	1.638
Maximum thickness	0.44	0.156
Interval between cuticular striations	0.015–0.03	0.012–0.015
Length of oesophagus	0.67	0.49
Size of oesophageal bulb	$0.118 \times 0.137$	$0.09 \times 0.103$
Nerve ring from anterior end	0.138	..
Length of spicule	0.114	0.094

Females much stouter than males. Length variable usually 3.35–7. Maximum width 0.33–0.98. Mouth surrounded by three bi-lobed lips. Pharynx small. Oesophagus very muscular, 0.8–1.15 long with more or less uniform breadth. Bulb measures 0.138–0.195  $\times$  0.156–0.234. Nerve ring approximately 0.09–0.14 from anterior extremity of body and excretory pore in between oesophageal bulb and vulva. Vulva a little behind middle of body, 1.54–3.22 from posterior end, and bounded by two lips—one anterior and the other posterior—more conspicuous in younger than in older specimens owing to the profuse uterine development and consequent body swelling of the latter. Vagina strongly muscular, 0.156–0.4 long, curving posteriorly to meet the ovejector. At this point of union is a sphincter through which runs the genital duct. Ovejector muscular, at its junction with vagina: further back the muscles become less prominent. It continues into the common reservoir, which runs posteriorly for a short distance, and then meets the two uteri, one a little posterior to the other. Tail divided into an anterior blunt portion and a terminal caudal spike, length 0.058–0.158 and 0.078–0.11 respectively. Eggs oval, 0.086–0.102  $\times$  0.055–0.063.



TEXT-FIG. 3.—*Thelandros kasauli*, sp. nov.

- a. Ventral view of posterior end of male; b. Lateral view of posterior end of male;  
c. Dorso-ventral view of anterior end; d. Lateral view of posterior end of female.

Of all the species included in this genus only three are known to possess males in which the spicules exceed a length of 0.1; these are *Thelandros*

*echinatus* (Rudolphi, 1819), *T. numidicus* Seurat, 1918, and *T. sexlabiata* Ortlepp, 1933, with spicules 1.105, 0.2 and 0.124 respectively. It is distinguished from *T. echinatus* in the presence of the postequatorial position of the vulva and the absence of the fringed anterior cloacal lip. In the absence of caudal alae it shows a marked difference from *T. numidicus* Seurat, 1918. It differs from *T. sexlabiata* in the absence of oesophageal funnel and the cuticular alae in the female; the pointed caudal extremity of the male and the presence of the terminal spike on the blunt end of the tail are further distinguishing characters.

***Thelandros micruris* Rauther, 1918.**

In all eight females were obtained. The dimensions were larger than those recorded by Rauther (1918). Length 4.6–5.73, maximum thickness 0.487–0.546. Cuticular striations 0.02–0.04 apart. Nerve ring at about 0.126–0.146, and excretory pore 1.13–1.4, from anterior end. Length of oesophagus 0.79–0.936. Tail short and conical, approximately 0.28–0.37 long. Vulva with conspicuous anterior lip, close behind middle of body, 2.1–2.63 from posterior extremity of body. Uterus mostly devoid of eggs, when present oval and approximately  $0.07 \times 0.047$ .

***Kalicephalus parvus* Maplestone, 1932.**

Ortlepp (1923) under the name of *Kalicephalus parvus* described one male and two immature females from the stomach of *Lampropeltis getulus* (Linnaeus, 1766) (syn. *Coronella getula*) from North America. Due to an oversight Maplestone in 1932 recorded under the same name three specifically distinct male nematodes from the intestine of the common Indian cobra, *Naja naja* (Linnaeus, 1758) (syn. *Naia tripudians*). On the attention of Dr. Maplestone being drawn to this, he suggested to the author to rename the species; the name *K. maplestonei* nom. nov. (= *K. parvus* Maplestone 1932 nec Ortlepp 1923) is therefore proposed for it.

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